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ABSTRACT

In order to compare the behavior of teachers at different grade levels within Project PLAN, a program of individualized instruction, eight observers were trained in the use of a specially developed teacher observation system (PLAN-TOS) which includes 17 categories of behavior, and observations were made of all 66 Project PLAN teachers in the 14 San Francisco Bay Area participating schools. The research hypotheses, based on the fact that the individualized instruction program is more structured at the primary level, were that PLAN primary level teachers would spend significantly more time than PLAN upper level teachers in group discussion and that PLAN upper level teachers would spend significantly more time than PLAN primary level teachers in individual instruction. Results indicated no significant difference between the two groups in group discussion time. There was a significant difference in individualized instruction time, but it was in the opposite direction than predicted. The PLAN-TOS has been expanded to include more categories of group discussion for more precise anaylsis. (RT)

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Comparison of Teacher Behavior at Different Grade Levels within Project PLAN: a Program of Individualized Education

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The original Title III ESEA proposal (Shanner, et al., 1967) stated that one of the intermediate objectives of the teacher training project was to change the behavior of the teacher in classrooms using programs of individualized instruction. We therefore developed the PLAN Teacher Observation Scale (PLAN TOS) in order to observe the actual behaviors of teachers in Project PLAN classrooms.

The emphasis in the PLAN TOS is on the verbal behavior of the teacher. Non-verbal behaviors, such as gestures and facial expressions, should be taken into account by the observer in classifying the behavior of the teacher, but they are not recorded as separate behaviors except in the two categories of Behavior Modification.

Several observation scales of teacher behavior have been developed for use in traditional classrooms. The Flander's Interaction Analyses technique (Amidon and Flanders, 1963), the Verbal Interaction Category System (VICS) of Amidon and Hunter (1967), and Hough's Observational System for Instructional Analyses (1967) represent some of the better known instruments for the observation of teacher behavior. Medley and Mitzel (1958, 1959, 1963) developed an instrument named OScAR (Observation Schedule and Record) to quantify the behavior of beginning teachers so that the behavior could be correlated with a number of other variables.

All of the data reported here were collected by trained observers who observed teachers in their ongoing classrooms. The use of the PLAN TOS is an attempt to develop an objective record of the classroom behavior of teachers in individualized instructional programs. The observer tallied the behavior of the teacher into 17 predefined categories according to what behavior occurred and how often it occurred. The observer who recorded the behavior of the teacher did not record the behavior of the students. Another observer in the same classroom used the PLAN Student Observation Scale (PLAN SOS) to record the behavior of the students (Lipe, et al., 1969). The observer who used the Teacher Observation Scale (PLAN TOS) was concerned only with teacher behavior.

The use of PLAN TOS requires the observer to classify the behavior of the teacher over a five-second interval into one of 17 categories. If more than one category of behavior occurred during that five-second period, the observer was instructed to record the latter category.

The observers trained to use the PLAN TOS were permitted to change a category classification at a later time only under a single exception. The exception involved the change thereafter from category 8 (tutoring) to category 9 (lecturing) whenever the teacher talked for a period of time greater than sixty seconds. For all other categories of teacher behavior, the observer was instructed to code each five-second time period as a unit and then to forget that time period.

Brief Description of the PLAN TOS Categories

The PLAN TOS was expanded to 17 categories after preliminary reliability studies indicated that these 17 categories permitted the best description of events which we would expect to occur in Project PLAN classrooms, so that the categories would be clearly defined, distinct, reliable, and would reflect important differences among teacher activities in individualized instruction that can be easily discriminated by observers. A brief description of the 17 categories of the PLAN TOS appears below:

Teacher Behavior Categories

Category Description	Category Number	Example
Individual Instruction (Teacher interaction with one student)		
Diagnostic and didactic inquiry	(1)	The teacher asks a student, "After you divide by 2, what should you do?"
Decision facilitating	(2)	The teacher asks, "What do you think you should do to prepare yourself better for the next test?"

Category Description	Category Number	Example
Solution giving	(3)	The teacher tells a student, "Chartres is in France, not Belguim."
Extending concepts and interests	(4)	The teacher asks a student to give examples from his own experience.
Silent attending	(5)	The teacher observes a student work a problem.
Group Discussion (Teacher interaction with two or more students)		
Modeling the discussion leader role	(6)	The teacher interrupts a group discussion to explain or point out a function of the group leader.
Leading group discussion	(7)	The teacher, leading a group discussion, asks one of the silent students what his opinion is.
Tutoring (discussion)	(8)	The teacher, leading a group discussion, ask a student to describe the TLU objective in his own words.
Providing content (lecturing)	(9)	The teacher, leading a group discussion, describes the plot of a story.
Silent attending	(10)	The teacher, leading a group discussion, pauses after calling on a non-participant.
Behavior Modification		
Giving positive verbal or non-verbal message	(11)	The teacher says to a student, "It's good to see you studying so hard today."
Giving a negative verbal or non-verbal message	(12)	The teacher criticizes a student for scuffling.
Systems Management		
Managing records and computer materials	(13)	The teacher checks computer test cards for marking errors.

Systems Management	Category Number	Example
Managing learning materials and equipment	(14)	The teacher mends a broken recording tape.
Managing student activities	(15)	The teacher tells the class, "All right children, get out your teaching-learning units and start to work."
Observing, listening, walking	(16)	The teacher walks around the classroom observing students at work.
Other		
Activities unrelated to instruction	(17)	The teacher collects lunch money.

Selecting and Training Observers

A group of four women (Group I) was trained during the middle of March, 1969, to use the teacher observation form. The training procedure was replicated with another group of four women (Group II) during the last two weeks of May, 1969.

Group I. The first group of four women ranged in age from 23 to 35. Their educational experience ranged from one year of college to one and one-half years of graduate school. Two of the group had had no teaching experience, the third had three years teaching experience and the fourth five years of teaching experience. A brief outline of the training program appears in Table 1. The observation process developed into a smooth rhythm of observing for three seconds, deciding during the fourth second which category represents that behavior, and recording during the fifth second. If a teacher switched behaviors during the three seconds, (e.g., if he changed from talking to attending to a student) the latter behavior of the interval was recorded. If a teacher performed two behaviors simultaneously, both behaviors were recorded. If the teacher walked about the room the observer followed the teacher at a respectable distance in order to hear the comments of the teacher.

The reliability study was designed to include eight observations each at the primary, intermediate, and secondary levels. Observers were randomly assigned to

teams and each team observed two Project PLAN classes and two traditional classes at one level. The reliability data in Table 2 indicated that observer "A" needed additional practice and so we decided to pair observer "A" again with observers "B" and "C" for four additional observations at the end of the reliability study. These are also reported in Table 2. All reliabilities of the extended practice for observer "A" were above 0.85. Eighteen out of 28 total reliabilities were above 0.85. Observers C and D of Group I collected all of the PLAN TOS data reported in this article.

Group II. The second group of women ranged in age from 22 to 56. All four had earned a bachelors degree and one had one year of teaching experience.

The design of the reliability study with Group II is the same as that of Group I. The results are given in Table 3 and only three of the coefficients are less than 0.85.

Data Collection

The observations were organized so that all 66 Project PLAN teachers in the 14 San Francisco Bay Area schools participating in Project PLAN and 32 randomly selected non-PLAN Control teachers would be observed for three separate 20 minute observational sessions for a total of one hour's observation of each of 98 teachers. The distribution of Project PLAN and Control teachers across elementary grade levels and secondary subject areas is shown in Table 4. Observations were made by two teams of observers. One member of each team observed and recorded teacher behavior while the other member concurrently observed and recorded student behavior using a separate instrument which we have termed the PLAN SOS (Lipe, et al., 1969). A comparison of the behavior of PLAN teachers and Control teachers has been discussed elsewhere (Quirk, et al., 1969).

The principal or another administrator in each school notified both the Project PLAN teachers and the Control teachers that observers would visit their classes on three separate occasions over the period of the next four to six weeks. He explained

that their visits would be unannounced, that the data would not be reported to any school official or be seen by anyone other than the observers and the research team, and that the teachers should proceed with their normal activities whether or not the observers were present.

For various reasons individual teachers, and in one case a whole school, could not be visited. One Project PLAN teacher contracted pneumonia and only one observation was made in her class. One school was not visited at all because parent visitation week, standardized testing, and other special activities occupied too large a portion of the observation period to permit completion of one hour's observation of the teachers over three visits. The distribution of Project PLAN and Control teachers that were observed for one hour is shown in Table 4.

In order to obtain three observations on as many teachers as possible observers during the final phase were permitted to observe two intermediate level PLAN teachers twice on the same day. All other PLAN teachers were observed on three different days over the period from April 11 through May 29, 1969.

No substitute teachers were observed and the observers did not notify the teachers in advance of their visit. The observers did phone the principal's office on the day before visiting a classroom to notify the principal of their visit and to check on the administrative schedule for the following day.

Hypotheses

The rationale for the hypotheses of this study is closely related to a three-day training conference that was held for all western PLAN teachers in late August 1968. The PLAN teachers viewed films and completed practice exercises in diagnosing learning problems in students and in decision-facilitating, studied four programmed booklets on student-managed behavior which included an emphasis on the use of positive reinforcement to shape student behavior, and modules on classroom organization and the function and operation of the computer services within Project PLAN. The emphasis on the pre-service August training program and throughout the

in-service training programs during the school year was to train the teachers to train the students to assume responsibility for their learning by using instructional materials and equipment independent of teacher supervision so that the PLAN teachers could be relieved of this administrative duty. The August 1968 conference included an additional set of four programmed booklets which dealt with student managed behavior, a module on testing within Project PLAN, a videotape model on the use of planning strategies and practice by the teacher with a student in the use of these strategies; and one-half of the PLAN teachers also viewed a videotaped model of tutoring strategies and practiced these techniques with a student while videotaping their performance.

The conference emphasized that since most of the content necessary to achieve the instructional objectives is presented in PLAN in the teaching learning units (TLUs) and since each student receives a program of studies through which he proceeds at his own best pace, lecturing to the entire class is an inappropriate behavior in many instances within a PLAN classroom. For a further discussion of the differences between a PLAN classroom and a traditional classroom, see Flanagan (1967; 1968) and Quirk (in press). Eight of the PLAN teachers reported in this study did not attend the August conference, but in every case except for the videotapes, the PLAN consultants carried the printed materials to the teachers in their classrooms early in the fall.

The structure of the PLAN curriculum at the present time and the differences between the activities of the Teaching-Learning Units at the various levels led us to propose a specific hypothesis concerning differences between levels of PLAN teachers. Because the PLAN curriculum at the primary level is highly structured and sequenced, there is the probability that primary level students can spend more time in group discussion than students at other levels because more primary level students are likely to be studying the same TLU and because of the limited

reading ability of the primary level students. There are also fewer specific group activities written into the TLUs as the student levels increase, with the fewest number of group activities written into the secondary level TLUs. Since the students at the earlier levels are expected to spend more time in group activities, this also means that students at the earlier levels should spend less time than students at the later levels in individual instruction. We, therefore, proposed the following hypotheses concerning differences between levels of PLAN teachers:

Hypothesis one: PLAN teachers at the upper grade levels should spend significantly more time than PLAN teachers at the lower grade levels in total individual instruction.

Hypothesis two: PLAN teachers at the lower grade levels should spend significantly more time than PLAN teachers at the upper grade levels in total group discussion.

In each case, the PLAN teachers in a given subgroup were ranked in terms of the percent of time which each teacher spent in the activity in question, and the tabled comparisons of PLAN teachers report the mean percent of time spent in each activity by the subgroup of teachers.

In order to increase the number of teachers in each subgroup, the level one and level two teachers were combined into a single group of primary level teachers. Similarly, the level five and level six teachers were combined to form the group of intermediate level teachers, and the level nine and level ten teachers were combined to form the group of secondary level teachers.

The data summarizing differences between primary, intermediate, and secondary level PLAN teachers are presented in Table 5, Table 6, Figure 1, and in Figure 2. Kruskal-Wallis one-way analysis of variance (Siegel, 1956) was computed for the categories of the hypotheses. If the Kruskal-Wallis H Test was significant, then Mann-Whitney U Tests were computed between the pairs of groups of teachers at the three levels for that category. Neither the Mann-Whitney U Test nor the Kruskal-Wallis H test were corrected for ties.

As predicted, the Kruskal-Wallis H Test for total individual instruction (categories 1+2+3+4+5) was significant, but the subsequent Mann-Whitney U Tests were not in the predicted direction. There was not a significant difference between the amount of time that the PLAN primary level and PLAN intermediate level teachers spent in individual instruction, but, contrary to the hypothesis, intermediate level PLAN teachers spent significantly more time than the secondary level PLAN teachers in total individual instruction and primary level PLAN teachers spent significantly more time than the secondary level PLAN teachers in total individual instruction. PLAN teachers spent 36 percent, 36 percent, 28 percent of their time at primary level, intermediate level, and secondary level, respectively, in total individual instruction.

The hypothesis that there would be a significant difference between levels of PLAN teachers in the amount of time they spent in total group discussion was not supported because the Kruskal-Wallis H Test for total group discussion (categories 6+7+8+9+10) was not significant. PLAN teachers at the primary level, intermediate level, and secondary level spent 13 percent, 10 percent, and 14 percent of their time, respectively, in total group discussion.

This year we expanded the PLAN TOS to include five categories for large-group discussion (i.e., discussion by the teacher with more than one-half of the class) and the same five categories under a major heading for small-group discussion (i.e., discussion by the teacher with at least two students but less than one-half of the students in the class) instead of the single major category for group discussion in the present version of the PLAN TOS. In this way we will be better able to compare PLAN and Control teachers in the amount of time they spend in different activities within different types of group discussion instead of just one type of group discussion.

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Table 1

Brief Outline of the Observer Training Program

I. Pre-training Orientation Session (about two hours)
   A. Complete the "First Practice Trials Categorizing Student and Teacher Behavior"
   B. Read "Operational Definitions of Teacher Behavior Categories".
   C. Peruse materials describing Project PLAN.

II. Orientation to Project PLAN Classrooms (about one-half day)
   A. Take a clip board with stop watch and observation forms.
   B. In several PLAN classrooms the trainer will point out examples of the teacher behavior categories as they occur.

III. Simulated Practice (about one-half day)
   A. Practice categorizing written examples of teacher behavior.
   B. Practice tallying responses and computing Scott's π.

IV. Practice Observation with Frequent Feed-back (as needed)
   A. In pairs, in a functioning classroom, discuss teacher behavior (about five mintues).
   B. Independently categorize teacher behavior (two minutes).
   C. Compare and discuss categorization decisions.
   D. Repeat B and C for about 20 minutes.
   E. Outside the classroom discuss unresolved questions and problems with the trainer.

V. Trial Reliability (as needed)
   A. In pairs, independently observe teachers in diverse classrooms for about 20 minutes each.
   B. Computer observer reliability in each classroom.

VI. Formal Reliability Study of the Instrument

Table 2

Observer Reliability

Group I

Grade Level Observed	Observer Pair	Scott's π			
		Project PLAN classes		Traditional classes	
Primary (Grades 1 & 2)	A-B	.81	.70	.72	.72
	C-D	.85	.82	.85	.97
Intermediate (Grades 4,5, & 6)	A-C	.61	.00	.94	.88
	B-D	.84	.89	.98	.85
Secondary (Grades 9 & 10)	A-D	.90	.91	.92	.95
	B-C	.67	.83	.87	.95
Secondary@ (Grades 9 & 10)	A-B	.91		.87	
	A-C	.95		.95	

@Reliabilities of the extended practice sessions for observer "A".

Table 3

Observer Reliability

Group II

Grade Level Observed	Observer Pairs	Scott's π			
		Project PLAN classes		Traditional classes	
Primary (Grades 1 & 2)	A-B	.96	.89	.92	.91
	C-D	.88	.79	.87	.95
Intermediate (Grades 4,5 & 6)	A-C	.88	.90	.89	.91
	B-D	.88	.92	.91	.71
Secondary (Grades 9 & 10)	A-D	.90	.95	.97	.95
	B-C	.81	.85	.93	.85

Table 4

Distribution of Project PLAN and Control Teachers

	Number of Elementary Teachers by Grade Level				Number of Secondary Teachers by Subject Taught				
	1	2	5	6	English	Social Studies	Math	Science	Total
Project PLAN Teachers									
Number of Teachers	12	12	12	12	5	5	4	4	66
Number Observed for One Hour	10	11	10	11	4	5	4	3	58
Control Teachers									
Number Randomly Selected	5	5	5	5	3	3	3	3	32
Number Observed for One Hour	4	4	5	5	2	3	2	3	28

Table 5
Comparison of PLAN Teachers
Primary vs. Intermediate vs. Secondary

Category	Teacher Observation Scale							
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Kruskal-Wallis	
	PLAN Primary Teachers (N=21)		PLAN Intermediate (N=21)		PLAN Secondary Teachers (N=16)			
Individual Instruction							H	x^2
1. Diag., & didac. inq.	3001	19.84	3613	23.94	2261	19.26		
2. Dec. facil.	13	0.08	24	0.15	38	0.32		
3. Sol giv.	109	0.72	356	2.35	171	1.45		
4. Ext. con. & int.	28	0.18	48	0.31	33	0.28		
5. Sil. att.	2225	14.71	1423	9.43	739	6.29		
Group Discussion								
6. Mod. dis. lead.	0	0.00	0	0.00	0	0.00		
7. Lead. gr. dis.	0	0.00	0	0.00	18	0.15		
8. Tutor.	1123	7.42	960	6.36	850	7.24		
9. Prov. cont.	57	0.37	8	0.05	148	1.26		
10. Sil. att.	769	5.08	582	3.85	636	5.42		
Behavior Modification								
11. Pos. mess.	299	1.97	131	0.86	23	0.19		
12. Neg. mess.	152	1.00	122	0.80	70	0.59		
Systems Management								
13. Man. comp. mat.	82	0.54	536	3.55	526	4.48		
14. Man. learn. mat.	1489	9.84	1295	8.58	1754	14.94		
15. Man. stud. act.	3697	24.45	3724	24.68	2109	17.97		..
16. Obs. list., walk.	1982	13.10	2187	14.49	2182	18.59		
Other								
17. Act. unrel. to inst.	93	0.61	77	0.51	176	1.49		
Total Individual Instruction (1+2+3+4+5)	5376	35.55	5464	36.21	3242	27.62	6.0	0.025*
Total Group Discussion (6+7+8+9+10)	1979	13.08	1550	10.27	1652	14.07	1.0	0.30
Total Behavior Modification (11+12)	423	2.79	253	1.67	93	0.79		
Total Systems Management (13+14+15+16)	7248	47.93	7742	51.31	6571	55.99		
TOTAL (1 through 17)	15119		15086		11734			

*p<.05
**p<.01

Table 6

Comparison of Levels of PLAN Teachers
for which the overall Kruskal-
Wallis H Test was Significant

Category	Mann-Whitney U Test					
	Primary Level vs. Intermediate Level		Intermediate Level vs. Secondary Level		Primary Level vs. Secondary Level	
	U	Z	U	Z	U	Z
Total Individual Instruction (Categories 1+2+3+4+5)	211.5	0.23	97	2.18*	99	2.12*

*p < .05

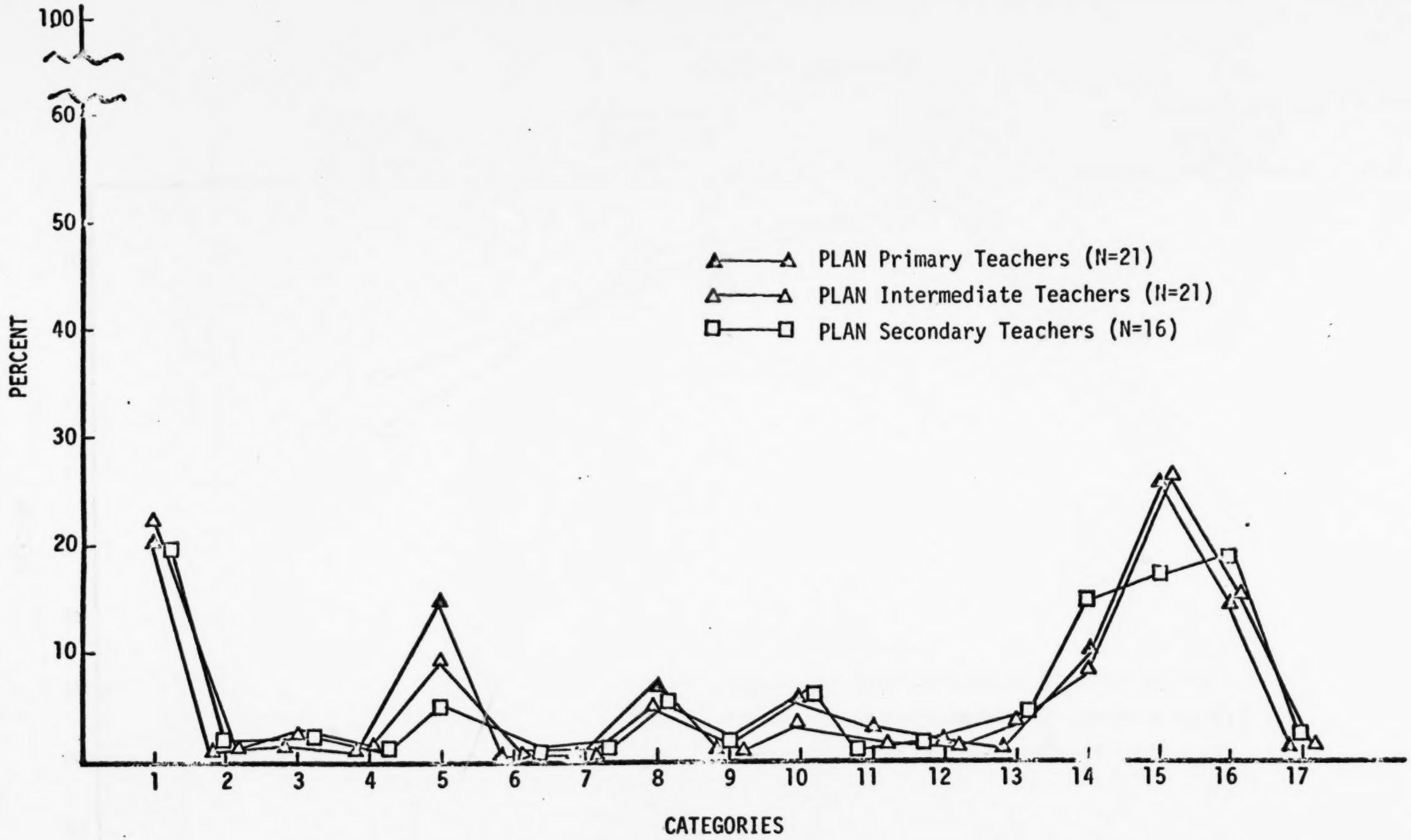

Figure 1 Percentage of time in 17 behavior categories by PLAN primary, intermediate, and secondary teachers.

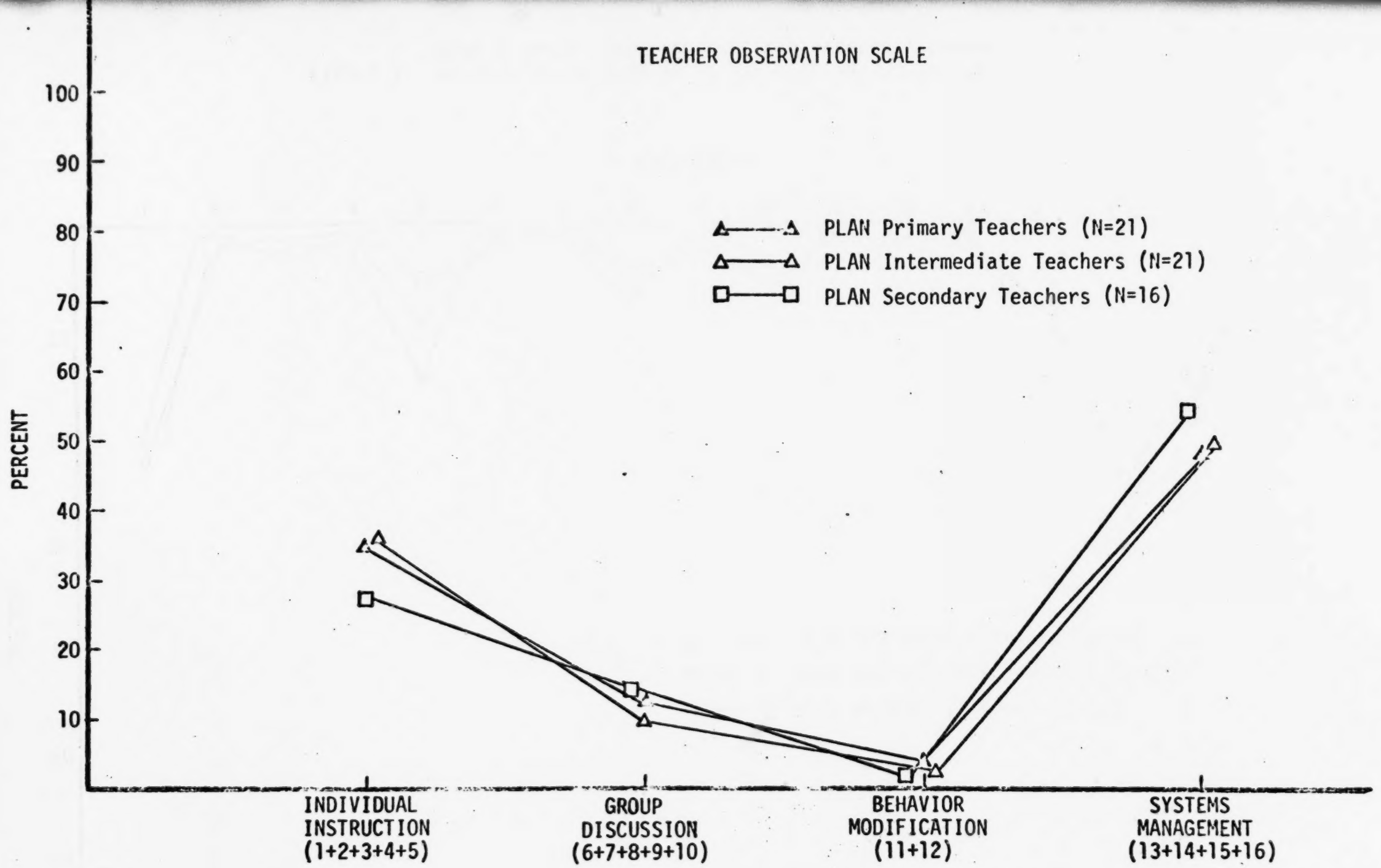

Figure 2 Percentage of time in four grouped behavior categories by PLAN primary, intermediate, and secondary teachers.